UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/563,862 | 05/12/2006 | Petrus A Van Nijnatten | 1328-26 | 3794 |

23117 7590 07/24/2008

NIXON & VANDERHYE, PC
901 NORTH GLEBE ROAD, 11TH FLOOR
ARLINGTON, VA 22203

| EXAMINER | |
|---|---|
| GUGLIOTTA, NICOLE T | |
| ART UNIT | PAPER NUMBER |
| 1794 | |
| MAIL DATE | DELIVERY MODE |
| 07/24/2008 | PAPER |

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/563,862 | VAN NIJNATTEN, PETRUS A | |
| | Examiner | Art Unit | |
| | NICOLE T. GUGLIOTTA | 1794 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *3/21/2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1 - 19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 - 19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/14/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 13, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Biornard (U.S. Patent No. 5,091,244).

3. In regard to claim 1, applicant claims an emission enhancing coating for a surface, which coating comprises at least one electrically conductive transparent film and at least two non-conductive films, wherein the conductive and non-conductive films have been applied alternatively on top of one another.

4. Biornard discloses an anti-reflective multilayer coating comprising alternating layers of electrically conductive and non-conductive films (Table 3, Figure 3, Column 8, Lines 33 - 36).

5. A multilayered coating on a surface, with alternating layers of conductive and non-conductive has antireflective properties. Emission can only occur as a result of the absorption of radiation by the surface. The total radiation is that which has been absorbed and reflected by a surface. Therefore if a coating minimizes does not reflect radiation, there is an increase in absorbed radiation, which in turn produced in increase

in emitted radiation. Therefore an anti-reflective coating would increase the emission of radiation from a surface with an anti-reflective coating applied. Anti-reflective coatings are comprised of multilayered films of alternating conductive and non-conductive layers, which are common in the art.

6. In regard to claim 2, applicant claims the total thickness of the coating is smaller than the wavelength of radiation to be emitted by the surface.

7. Biornard discloses a total coating thickness of 156.5 nm in Table 1. In all computations, the layer systems have been optimized to yield the lowest possible reflection in the wavelength range from about 425 nm to about 675 nm (Column 8, Lines 28 – 32).

8. Each of these layers had a thickness of one quarter of the wavelength or less, which means based on the commonly accepted principle of quarter wavelengths in anti-reflective coatings, any reflecting radiation waves would have been cancelled out by destructive interference, and therefore it is assumed 100% of the radiation is transmitted through the coating and absorbed by the surface article, which would then be emitted.

9. In regard to claims 3 – 5, applicant claims the total thickness of the coating is at most 5 micrometers (as well as at most 20 micrometers and 100 micrometers).

10. Biornard discloses in Table 3 an embodiment of a multilayered coating with thicknesses of the layers corresponding to 75.2 nm, 12.7 nm, 48.7 nm and 20.9 nm.

The sum of these layers creates a coating thickness of 157.5 nm, which is equal to 0.157 micrometers.

11. Anti-reflective (emission enhancement) coatings are commonly found to be less than 5 micrometers, as shown by Biornard.

12. In regard to claims 6 - 7, applicant claims the electrically conductive film comprises a metal chosen from the group of chrome, nickel and rhodium.

13. Biornard discloses that chromium is a common metal in anti-reflective coatings. Chromium films have a relatively low value of k/n are not highly reflective and are strongly light absorbing (Column 2, Lines 44 –46, Table 2).

14. In regard to claims 8 – 9, applicant claims the electrically transparent film comprises a semiconductor chosen from a group of doped metal oxides, conductive nitrides and carbides, preferably, tin-doped indium oxide, fluorine-doped tin oxide and aluminum-doped zinc oxide.

15. Biornard discloses it to have been well known in the art at the time the invention was made that electrically-conductive, transparent films, such as indium tin oxide, may be used in such coatings (Column 2, Lines 9 – 10).

16. For the purpose of an emission enhancing/antireflective coating, indium tin oxide and tin-doped indium oxide are the same.

17. In regard to claim 10, applicant claims each of the electrically conductive and non-conductive films is transparent.

18. Biornard discloses that the first and outermost film 20 is substantially transparent to light (non-conductive film, Column 7, Lines 61 – 62), as well as film 26 (also non-conductive film, Column 7, Lines 65 –66).

19. In regard to claims 11 – 12, applicant claims the non-conductive film comprises a non-conductive comprises a non-conductive material chosen from the group of non-conductive metal oxides, metal fluorides, metal carbides and metal nitrides, specifically silicon oxide.

20. Biornard discloses the metal film to be in contact with a transparent dielectric (non-conductive) material, such as magnesium fluoride or silicon dioxide (Column 2, Lines 19 – 21, Table 3, Figure 3).

21. In regard to claim 13, applicant claims an article with a surface with a low emissivity to which an emission enhancement coating has been applied.

22. Biornard discloses the application of antireflection coating to articles such as sunglasses, solar control glazings, and contrast enhancement filters.

23. In regard to claim 18, applicant claims a method for applying an emission enhancing coating to a surface, wherein the conductive and non-conductive films have been applied alternately on top of one another to the surface.

24. Biornard discloses a preferred method of depositing these films is by DC reactive sputtering of the metal in an atmosphere including nitrogen or ammonia. Films may also be deposited by chemical vapor deposition (Column 5, Line 66 – Column 6, Line 1).

25. Claim 15 is rejected under 35 U.S.C. 102(b) as being unpatentable over Kaneko et al. (U.S. Patent No. 5,521,202).

26. Applicant claims a metal foil to which a coating according to claim 1 has been applied.

27. Kaneko et al. disclose in Figure 1 an interference layer, a recording layer, and a reflection layer are successively overlaid on a pre-grooved surface of a transparent substrate. On the surface of the other side of the substrate, specifically, the surface at which a recording or reproduction laser beam enters, an anti-reflection layer is formed. This anti-reflection layer is of a three-layered type, which is composed of a first transparent insulating film layer, a transparent electroconductive film layer, and a second transparent insulating film layer, which are successively overlaid on the substrate (Column 2, Lines 48 – 60). Kaneko et al. also disclose examples of the recording layer 3 include an amorphous rare earth element-transition metal alloy layer comprising, for example TbFeCo, NdDyFeCo, or TbDyFeCo; an oxide layer comprising, for example, $BaFe_{12}O_{19}$, $CoFe_2O_4$, or $(Bi,Y)_3Fe_5O_{12}$; and a polycrystalline alloy layer comprising, for example, MnBi, or CoPt (Col. 3, Lines 1 – 7).

***Claim Rejections - 35 USC § 103***

28. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

29. Claims 14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Biornard.

30. In regard to claims 14 and 19, applicant claims an article and method wherein as a first film, a non-conductive transparent film has been applied to the surface.

31. Biornard discloses a transparent non-conductive film, which alternates with a conductive film to create an antireflective coating. Biornard discloses the first film of $SnO_2$ (not doped), in direct contact with the supporting article (glass), to be the non-conductive film.

32. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Biornard, in view of Coleman (U.S. Patent No. 4,226,897).

33. Applicant claims a solar cell to which an emission enhancing coating has been applied.

34. Biornard discloses the application of an antireflection coating to articles such as sunglasses, solar control glazings, and contrast enhancement filters. Biornard does not disclose the specific application of the coating to a solar cell.

35. Coleman discloses a solar cell containing a semi-conductor, which comprises an antireflection layer such as $Si_3N_4$ with a thickness range of about 1000 A° may be applied to the electrode to reduced reflection loss under photon irradiation (Column 4, Lines 21 – 24).

36. It would have been obvious to one skilled in the art at the time the invention was made that the anti-reflective coating disclosed by Biornard could be applied to a solar cell, as it is known in the art that antireflective coatings are applied to semiconductors in solar cells.

37. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Biornard, in view of Dvorkis et al. (U.S. Patent No. 5, 923,021).

38. Applicant claims a light reflector to which an emission enhancing coating has been applied.

39. Biornard discloses the application of an antireflection coating to articles such as sunglasses, solar control glazings, and contrast enhancement filters. Biornard does not disclose the specific application of the coating to a light reflector.

40. Dvorkis et al. disclose an antireflective coating present on the front surface of the diffuser of a light reflector (Column 9, Lines 41 – 42 and Lines 56 – 57) .

41. It would have been obvious to one skilled in the art at the time the invention was made to apply an antireflective coating to a diffuser of a light reflector, as it known in the art, as disclosed by Dvorkis et al.

***Response to Arguments***

42. Applicant argues: "US 5, 091, 244, however, relates to an electronically-conductive visible light-attenuating antireflection coating for use in articles such as sunglasses and solar control glazings. In other words, the teaching of this patent is applied to a completely different light region, namely visible light instead of infrared light."

43. Applicant argues: "US 5,091,244...the teachings of this document also applies to the visible light region, not the infrared light region."

44. Applicant argues: "It observed the teaching of US 5,923,021 (as that of US 5, 091, 244) is applied to the visible light region, not the infrared light region."

45. Applicant's arguments filed March 21, 2008 have been fully considered but they are not persuasive. The claims are not limited to the IR region, but includes all regions of the electromagnetic spectrum with wavelengths under 100 μm (frequencies > $10^{12}$ Hz), which includes the visible light range.

46. Examiner notes the references (e.g. Biornard) cited in the office action disclose the components and required thicknesses of the coating of applicant's claims. Therefore similar properties between applicant's *claimed* invention and the prior art would be expected.

47. Applicant argues "thickness differs from the thickness of the non-conductive films that are defined in applicant's claim 1."

48. Examiner notes there are no thicknesses defined in claim 1 of applicant's application. Further, applicant claims the thickness of the coating must be less than 100 micrometers, 20 micrometers and 5 micrometers (Claims 3 - 5). As applicant has noted for Table 1, the thickness of these layers are 116 nm and 228 nm. The sum of these layers is calculated to be 344 nm, which is 0.344 micrometers, and therefore fulfills the requirements of applicant's claims for coating thickness to be less than 5 micrometers.

49. Applicant argues "the anti-reflective layer (of US 5, 251, 202) is not applied to a metal foil as claimed in claim 15."

50. Examiner brings applicant to the attention of Kaneko et al. (US 5, 521, 202), Col. 3, Lines 1 – 7, whom disclose the recording material is made of a transition metal alloy. One skilled in the art at the time the invention was made would recognize these transition metal alloys of the recording material to be metal foil substrates.

51. Applicant argues "it should be noted, however, that the use of such antireflective coatings on a solar cell would result in a decrease of the emissivity in the infrared light region."

52. First, in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies

(i.e., emissivity in the infrared light region) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

53. Examiner notes the reference was brought in to applicant's attention to demonstrate the common application of coatings as claimed by applicant (e.g. anti-reflective coatings) to solar cells and/or solar cell components.

***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE T. GUGLIOTTA whose telephone number is

(571)270-1552. The examiner can normally be reached on M - Th 8:30 - 6 p.m., & every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-272-1284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

NICOLE T. GUGLIOTTA
Examiner
Art Unit 1794

/Carol Chaney/
Supervisory Patent Examiner, Art Unit 1794